

ARGONNE NATIONAL LABORATORY

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July 23, 1984

RECEIVED

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J. R.

Dr. Jacob Thiessen
Mailstop E-201, Human Health Studies
Office of Health and Environmental Research
Office of the Environment
U.S. Department of Energy
Washington, D. C. 20545

SUBJECT: Congressional Investigation into Health and Safety Policies of the
Department of Energy (DOE)

Dear Dr. Thiessen:

In response to Dr. C. W. Edington's memorandum of June 27, 1984, on the above subject, I have enclosed a factsheet on "Plutonium Studies at the Center for Human Radiobiology (CHR)." The factsheet is in the format requested by Dr. Edington.

Please let me know if you need more information or documentation.

Sincerely yours,



A. F. Stehney
Environmental Research Division

AFS:pat
Enclosures

cc: H. Drucker
H. J. Rauch
P. Failla
P. F. Gustafson
E. Huberman
J. Rundo

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U.S. DEPARTMENT OF ENERGY

THE UNIVERSITY OF CHICAGO

Project Name:
Plutonium Studies at the Center for
Human Radiobiology (CHR)

Date Started: 2 January 1973
Date Terminated: Ongoing

Principal Investigators: R. E. Rowland, A. F. Stehney

Objectives of Test:

1. To determine the excretion rate of plutonium 27 years after injection.
2. To determine the retention and body distribution of plutonium.

Short Description:

In 1945-1947, 18 hospital patients of limited life expectancy were injected with plutonium in order to obtain information about the retention and organ distribution of plutonium. An important objective was to determine the relationship between the body content and the rate of excretion in order to provide data for estimating the body content of plutonium from measurements of plutonium in excreta (bioassay). The results of this study were described in Report LA-1151 (1950).⁽¹⁾

The data in LA-1151 were reviewed in a manuscript prepared by P. W. Durbin for publication in the 1972 volume, Radiobiology of Plutonium.⁽²⁾ Tissue and bone samples had been obtained at autopsy from six of the cases at times ranging from 5 days to 456 days after injection, and the longest collection time for excreta was about 5 years. In addition to preparing the manuscript, Durbin traced the later history of the cases and discovered that four were still living in 1972.

The Center's direct knowledge of the plutonium injection cases dates from December 13, 1972, when Dr. Durbin brought her records to CHR for possible further follow-up. The Center then undertook to determine excretion rates in study subjects who were still alive and to exhume deceased subjects in order to determine the amounts and body distribution of plutonium. During 1973, CHR obtained metabolism samples from three living patients, obtained permission to exhume from next of kin of three deceased patients, and disinterred and transferred to CHR the remains of one of these deceased. The metabolism samples (blood and excreta) were taken at Strong Memorial Hospital (SMH), Rochester, New York.

In 1974, the U.S. Atomic Energy Commission (AEC) reviewed the origins and subsequent follow-up of the plutonium studies. On December 31, 1974, the AEC authorized CHR to proceed with the program of study of the living patients who were injected with plutonium during 1945-1947 and of the bodies of deceased individuals from that group for whom legal consent for examination is obtained.

Follow-up Data:

Table 1 summarizes CHR follow-up activities and last known status (July 5, 1984) for each of the plutonium injection cases.

CHR personnel have published 10 reports on results obtained by study of these cases.⁽³⁻¹²⁾ Copies of these reports are attached.

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Table 1. Plutonium injection cases: Summary of CHR activities and last known status (July 5, 1984).

Old Case Number	CHR Case Number	CHR Activities	Status
Cal-I	40-001	10/16/75: Exhumed cremains Aug 78: Returned	Died 1/9/66
Cal-II	40-002	No contacts; said to have died in Australia	Died 1/6/47
Cal-III	40-003	6/11/73: Examined at CHR 6/23-26/77: Metabolism study at SMH	Living 10/19/83
Chi-1	40-004	6/10/75: Exhumed Apr 78: Returned	Died 10/3/45
Chi-2	40-005	No contacts; cremation ashes scattered	Died 1/13/46
Chi-3	40-006	No contacts; case unidentified	Lost to study, 1946
HP-1	40-007	1973: Next of kin refused permission to exhume	Died 1/12/60
HP-2	40-008	1973: Next of kin refused permission to exhume	Died 4/4/48
HP-3	40-009	1/28-2/18/73: Metabolism study and radioactivity measurement at SMH 1/23-24/79: Metabolism study at SMH	Died after 6/5/81
HP-4	40-010	9/24/73: Exhumed Jul 75: Returned	Died 4/29/47
HP-5	40-011	1973: Next of kin refused permission to exhume	Died 4/29/46
HP-6	40-012	2/14/73: Metabolism study at SMH 6/21-7/1/73: Metabolism study at SMH	Living 12/30/74
HP-7	40-013	1973 and 1977: Next of kin refused permission to exhume	Died 10/27/46
HP-8	40-014	No contacts	Died 11/22/75
HP-9	40-015	5/18/78: Exhumed Jul 81: Returned	Died 7/2/47
HP-10	40-016	No contacts	Died 6/2/57
HP-11	40-017	No contacts	Died 2/26/46
HP-12	40-018	No contacts	Died 4/13/53

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References:

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2. P.W. Durbin. Plutonium in man: a new look at the old data. In The Radiobiology of Plutonium, B.J. Stover and W.S.S. Jee (eds.), The J.W. Press, Salt Lake city, UT, pp. 469-537 (1972).
3. J. Rundo, P.M. Starzyk, J. Sedlet, R.P. Larsen, R.D. Oldham and J.J. Robinson. The excretion rate and retention of plutonium 10,000 days after acquisition. In Diagnosis and Treatment of Incorporated Radionuclides, Proc. Seminar, Vienna, 8-12 December 1975, IAEA, Vienna, pp. 15-22 (1976).
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5. R.A. Schlenker, B.G. Oltman, and H.T. Cummins. Microscopic distribution of ^{239}Pu deposited in bone from a human injection case. In The Health Effects of Plutonium and Radium, Proc. Symp. Sun Valley, Idaho, 6-9 October 1975, W.S.S. Jee (Ed.), The J.W. Press, Salt Lake City, UT, pp. 437-450 (1976).
6. J. Rundo and F.H. Ilcewicz. Blood content and excretory plasma clearance of plutonium 10^4 days after injection. Abstracts of Papers-22nd Ann. Mtg. Health Phys. Soc., Atlanta, 3-8 July 1977, Pergamon Press, NY, p.26 (1977); Health Phys. 33, 668 (1977).
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9. J. Rundo. The late excretion of plutonium following acquisition of known amounts. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 253-260 (1981).
10. R.A. Schlenker and B.G. Oltman. Plutonium microdistribution in human bone. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 199-206 (1981).

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11. R.A. Schlenker and B.G. Oltman. Uranium concentrations in human bone. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 473-476 (1981).
12. R.E. Toohey, C.G. Cacic, R.P. Larsen, and R.D. Oldham. The concentration of plutonium in hair following intravenous injection. Health Phys. 40, 881-886 (1981).

Attachments:

Reprints of references 3-12 are attached.

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